

# Insights from the Univ. of Arizona AAU STEM reform effort in Physics

## Reformed Class

- Two 50 minute lectures per week
  - Focused on introducing concepts using active engagement instructional strategies and on collaborative group problem solving
  - Minimal derivations of equations
- Each student also attends a 50 minute recitation sections per week
  - Led by graduate TA with assistance from undergraduate peer instructors
  - Students work on collaborative tutorials, which promote reasoning abilities and problem solving skills
- Instructor experienced in astronomy and physics education research, but teaching PHYS 141 for the first time

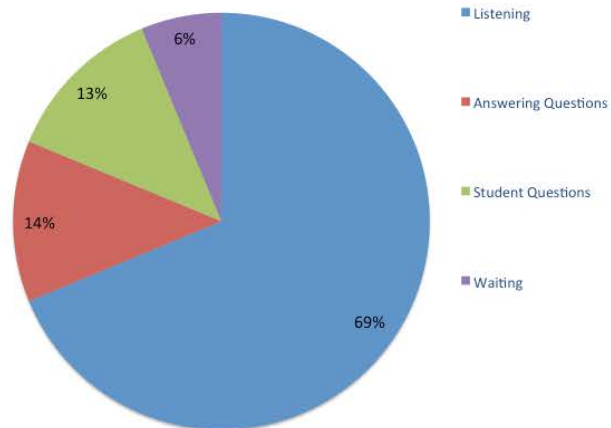
## Traditional Class

- Three 50 minute lectures per week
  - Focused on introducing concepts and on instructor-led modeling of problem solving
  - Many derivations of equations
- Instructor experienced in teaching PHYS 141 and widely regarded by faculty and students as an excellent lecturer

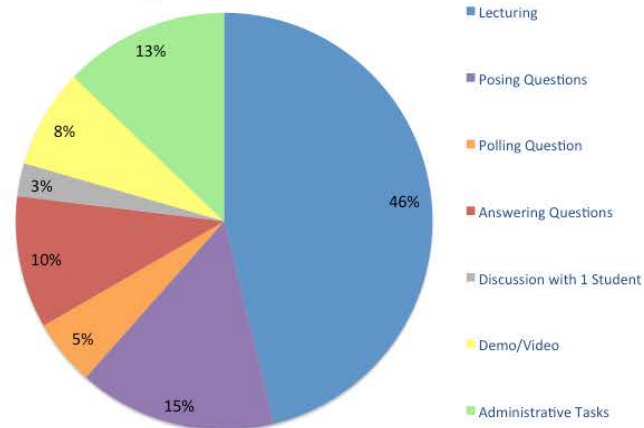
# COPUS data from UA Calc-Physics Course Reforms

## Professor #1 Traditional

Student Doing

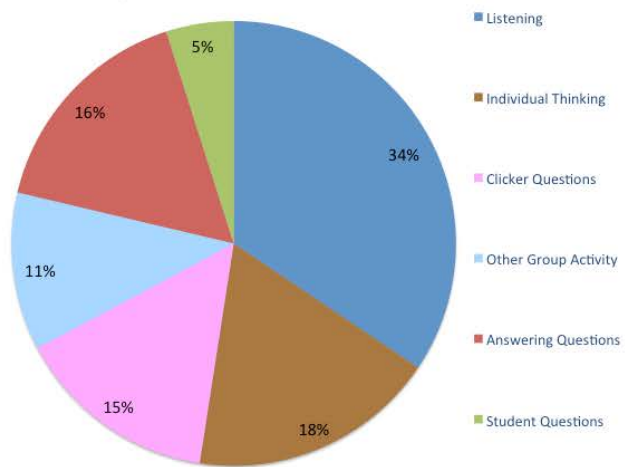


Professor Doing

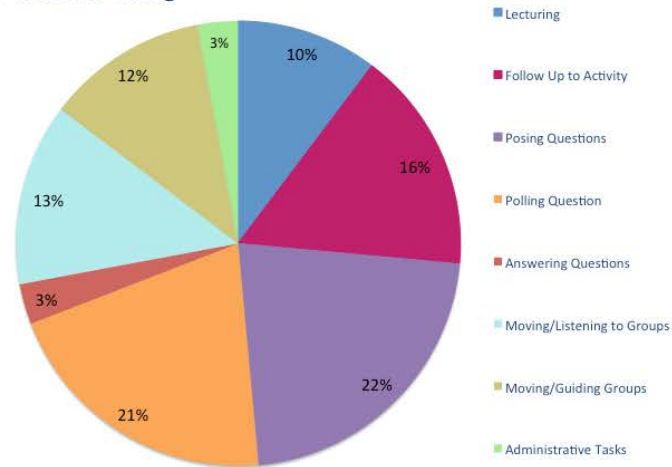


## Professor #2 Reformed

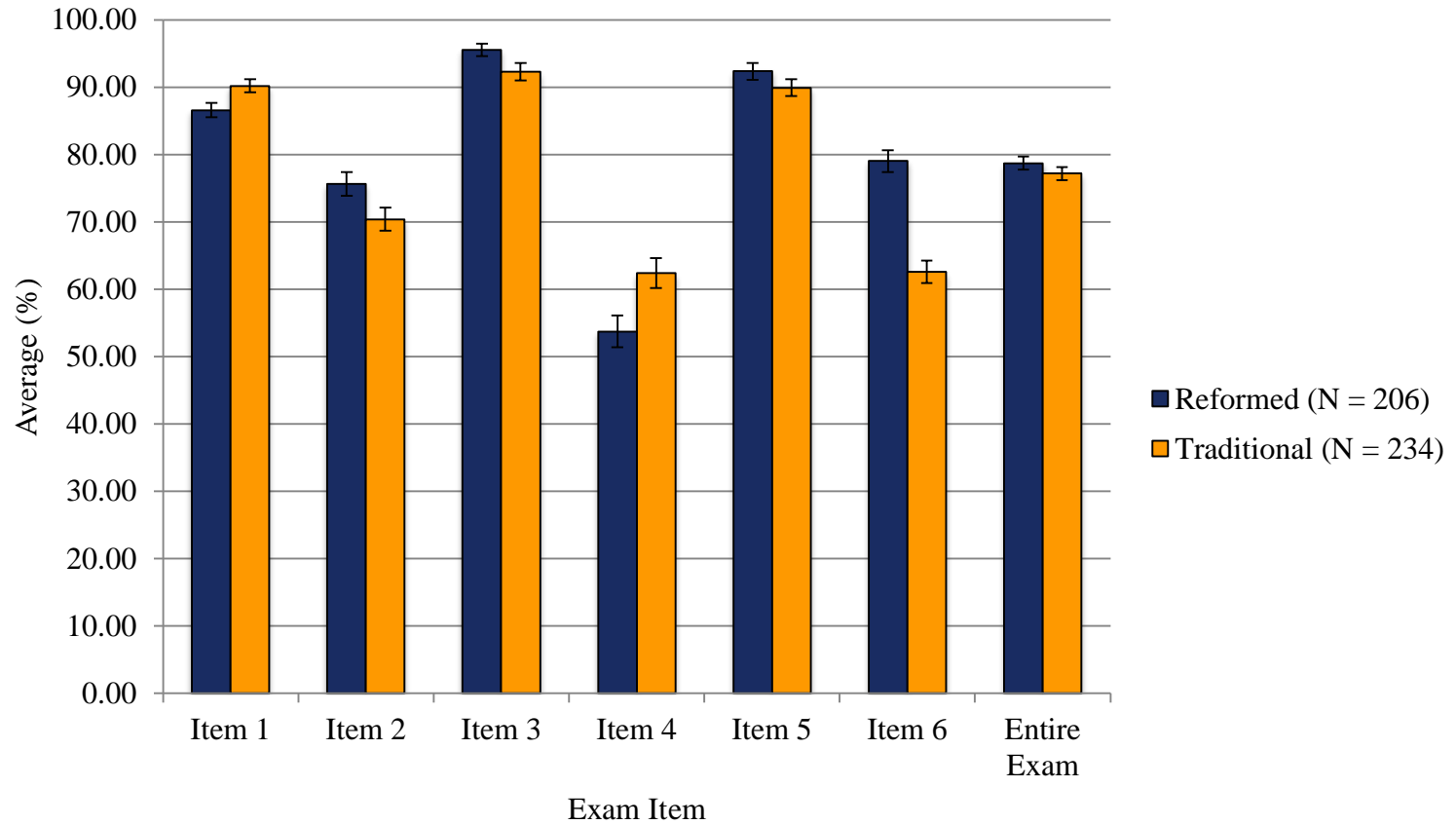
Student Doing



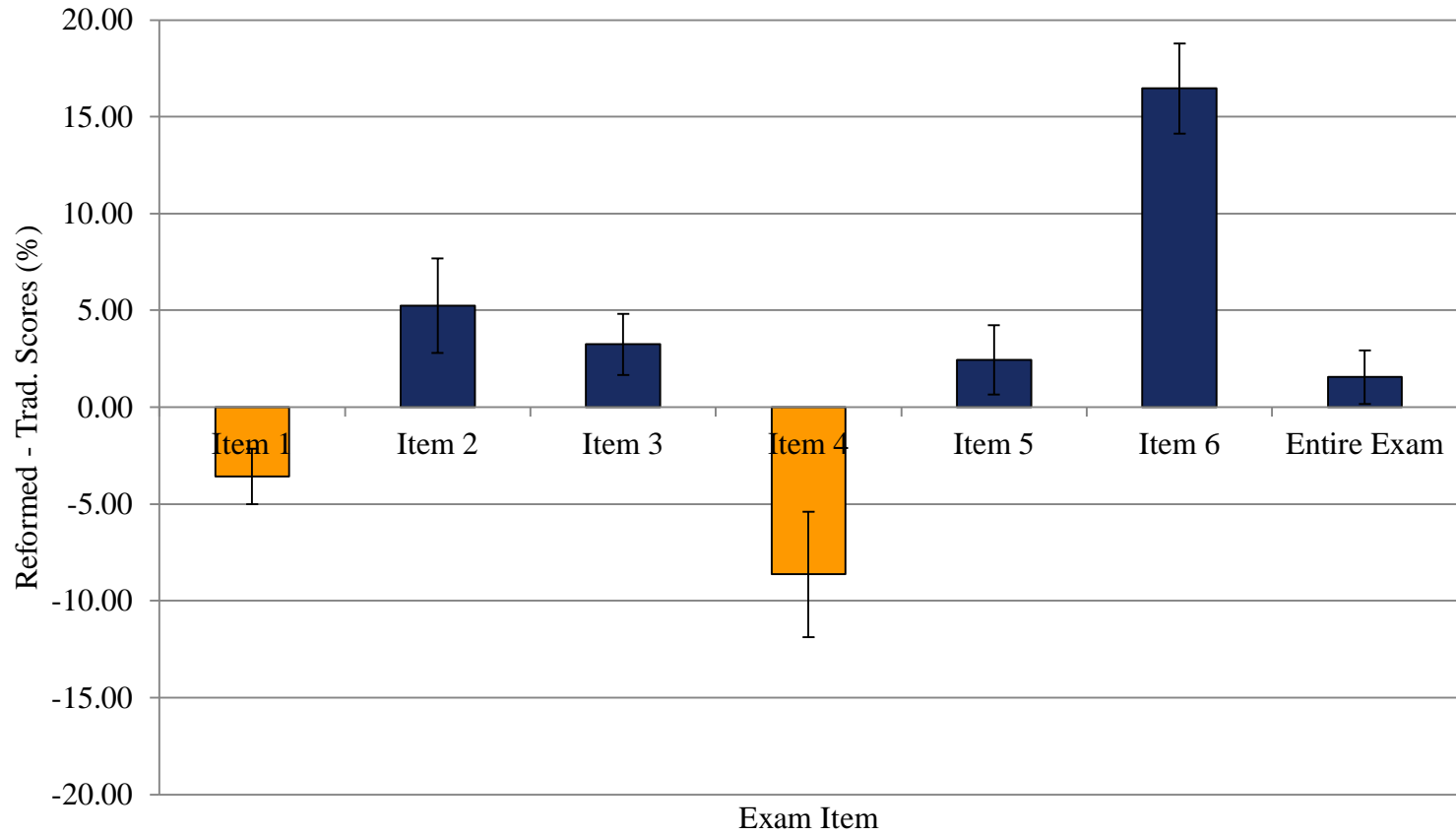
Professor Doing



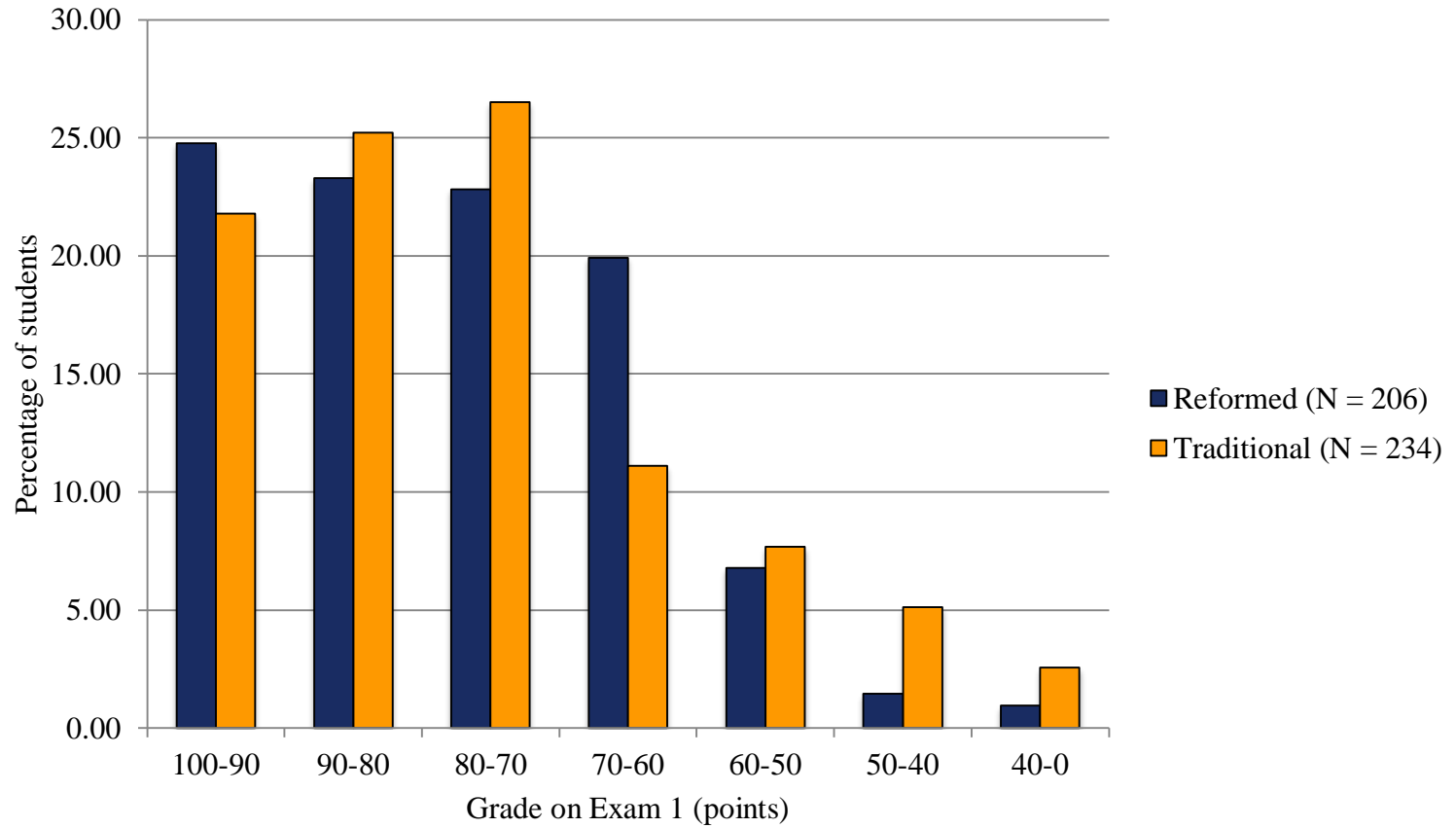
## Exam 1



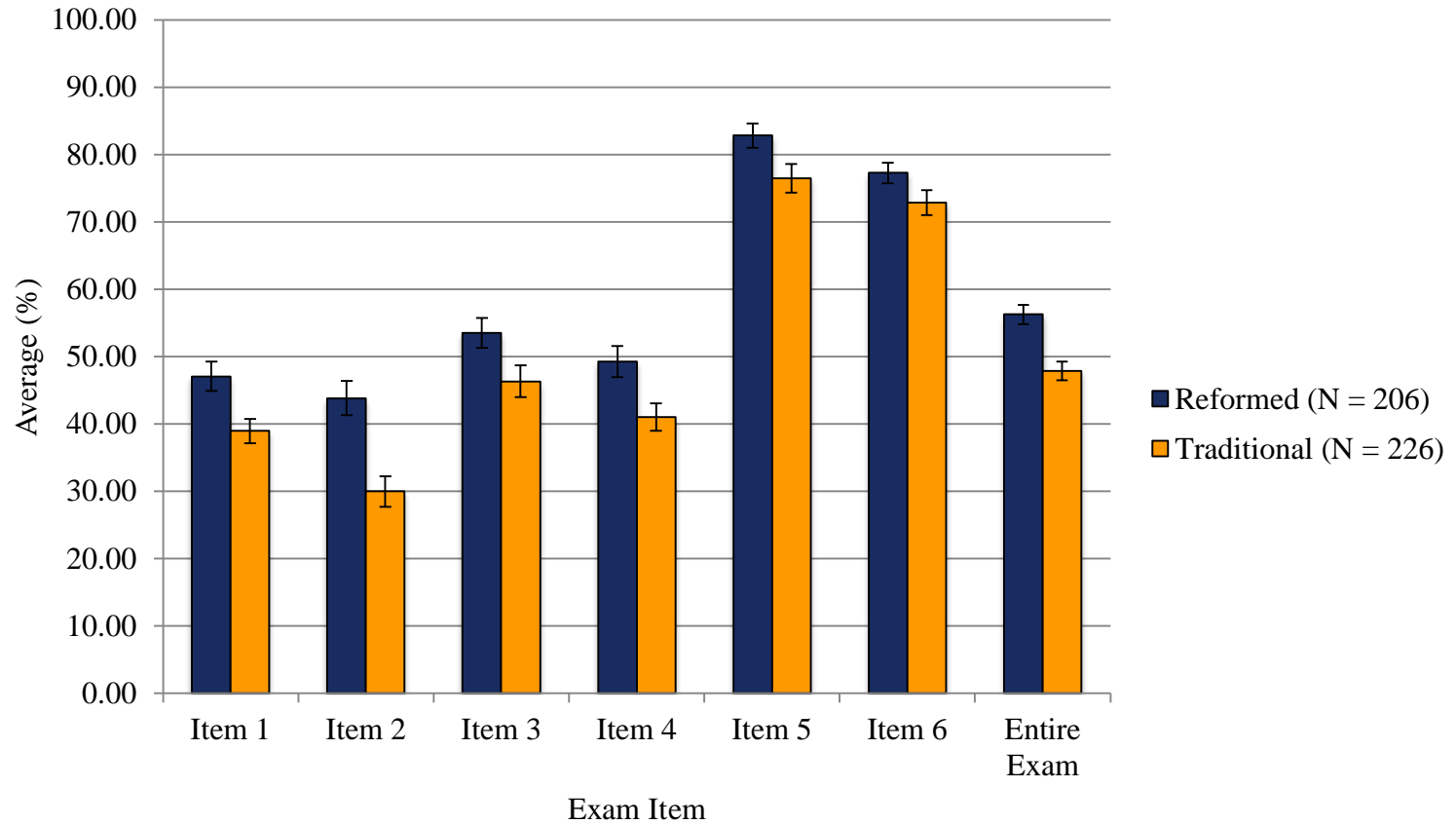
# Exam 1



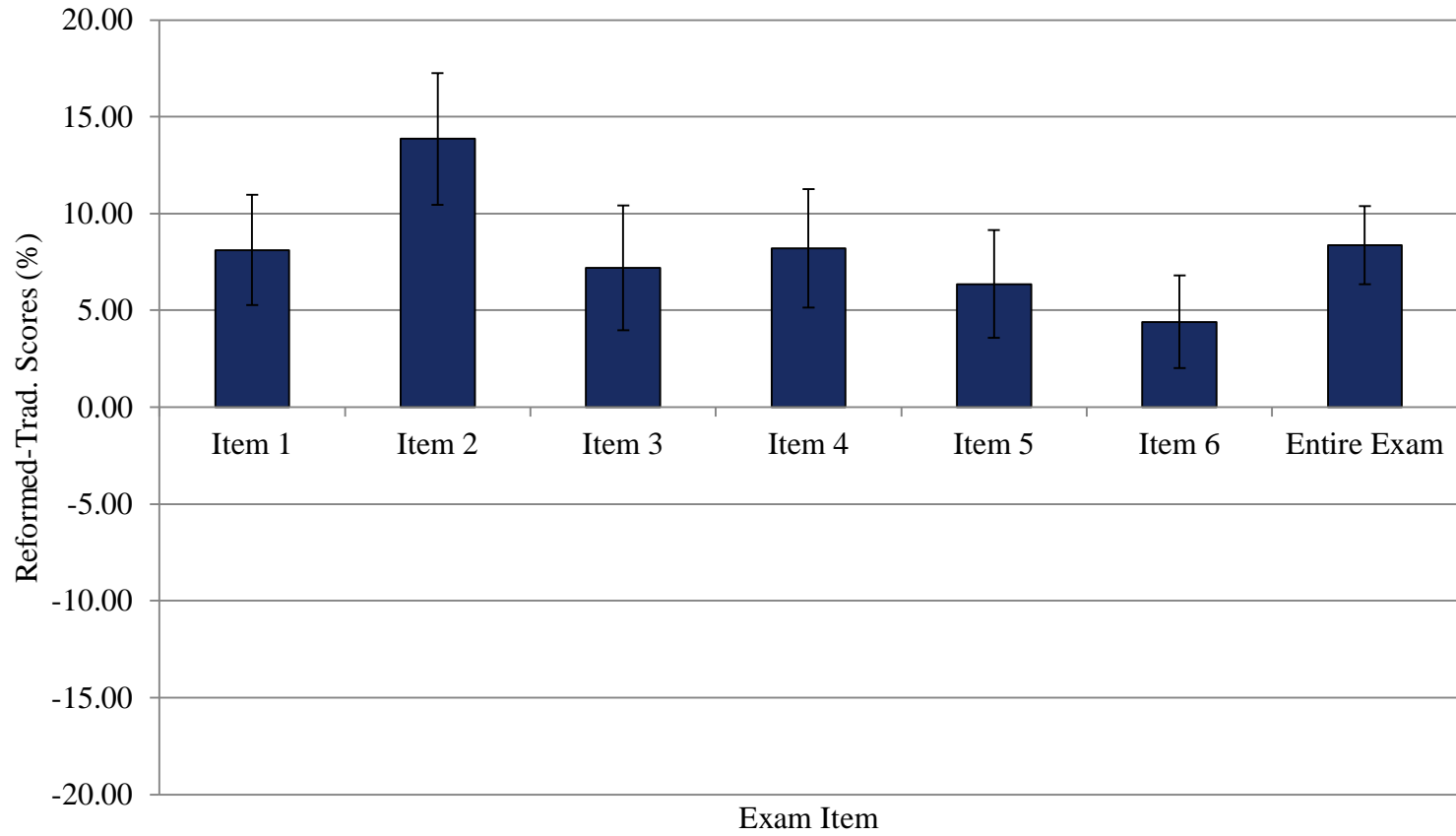
## Exam 1



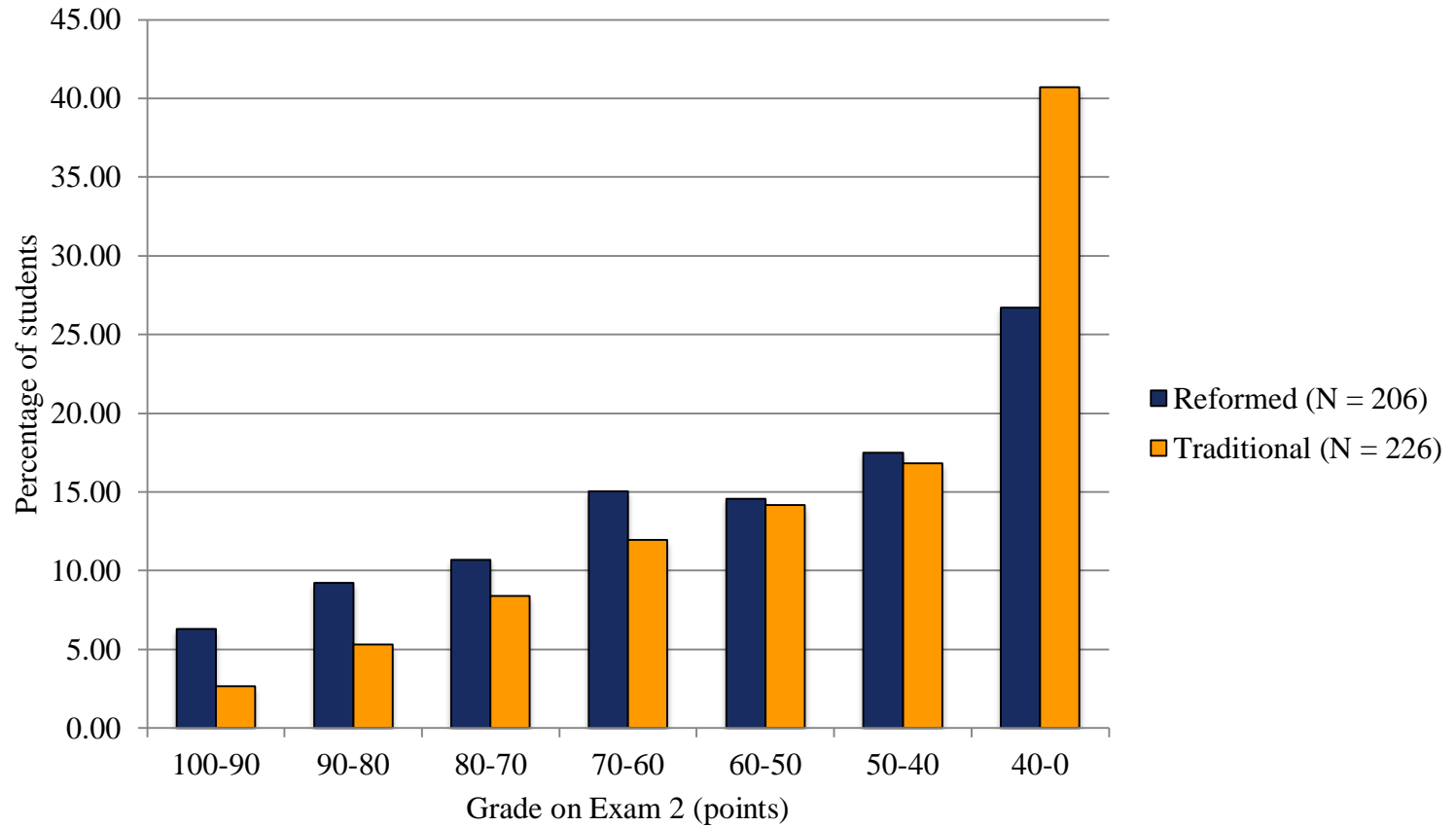
## Exam 2



## Exam 2

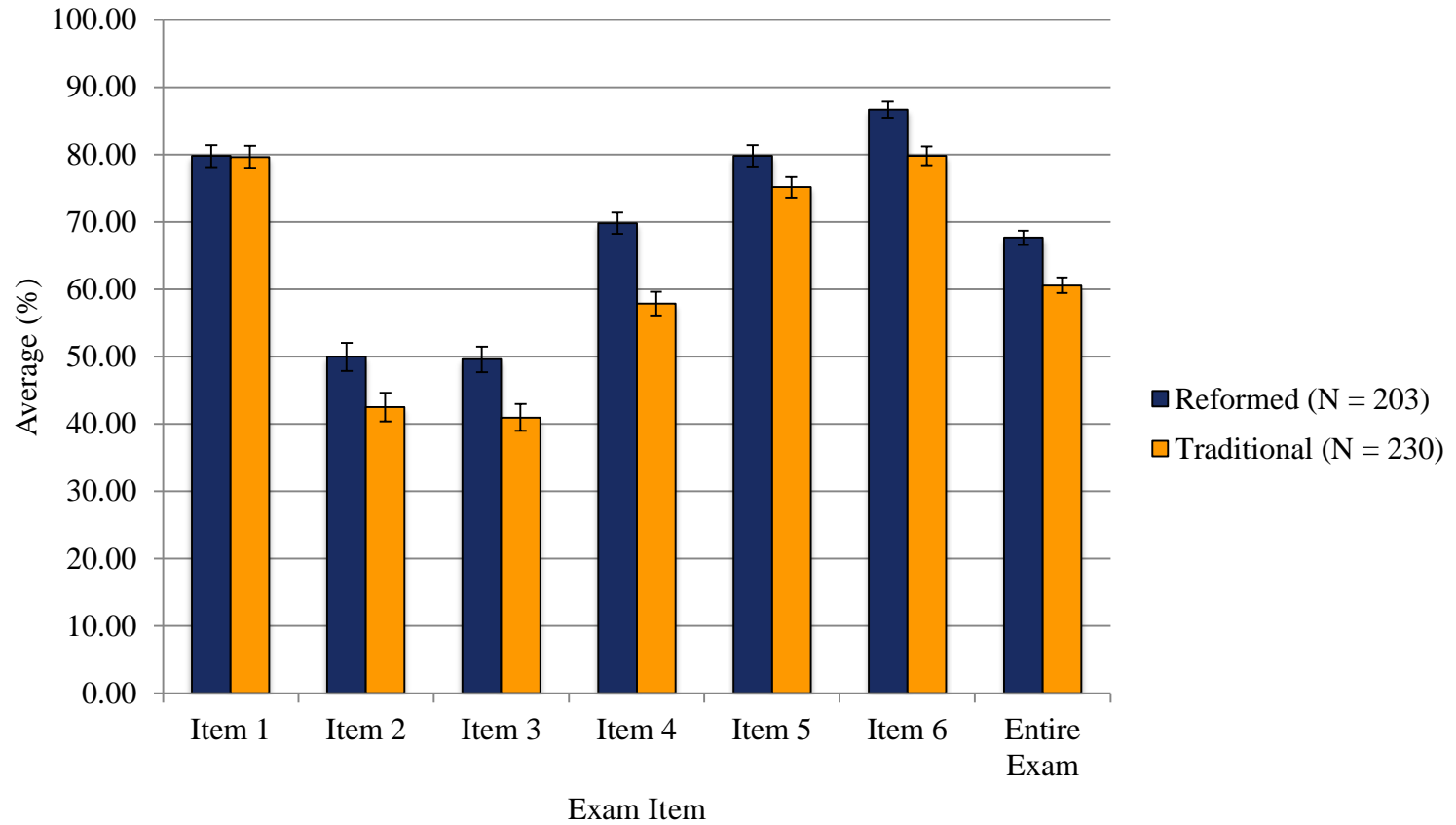


## Exam 2

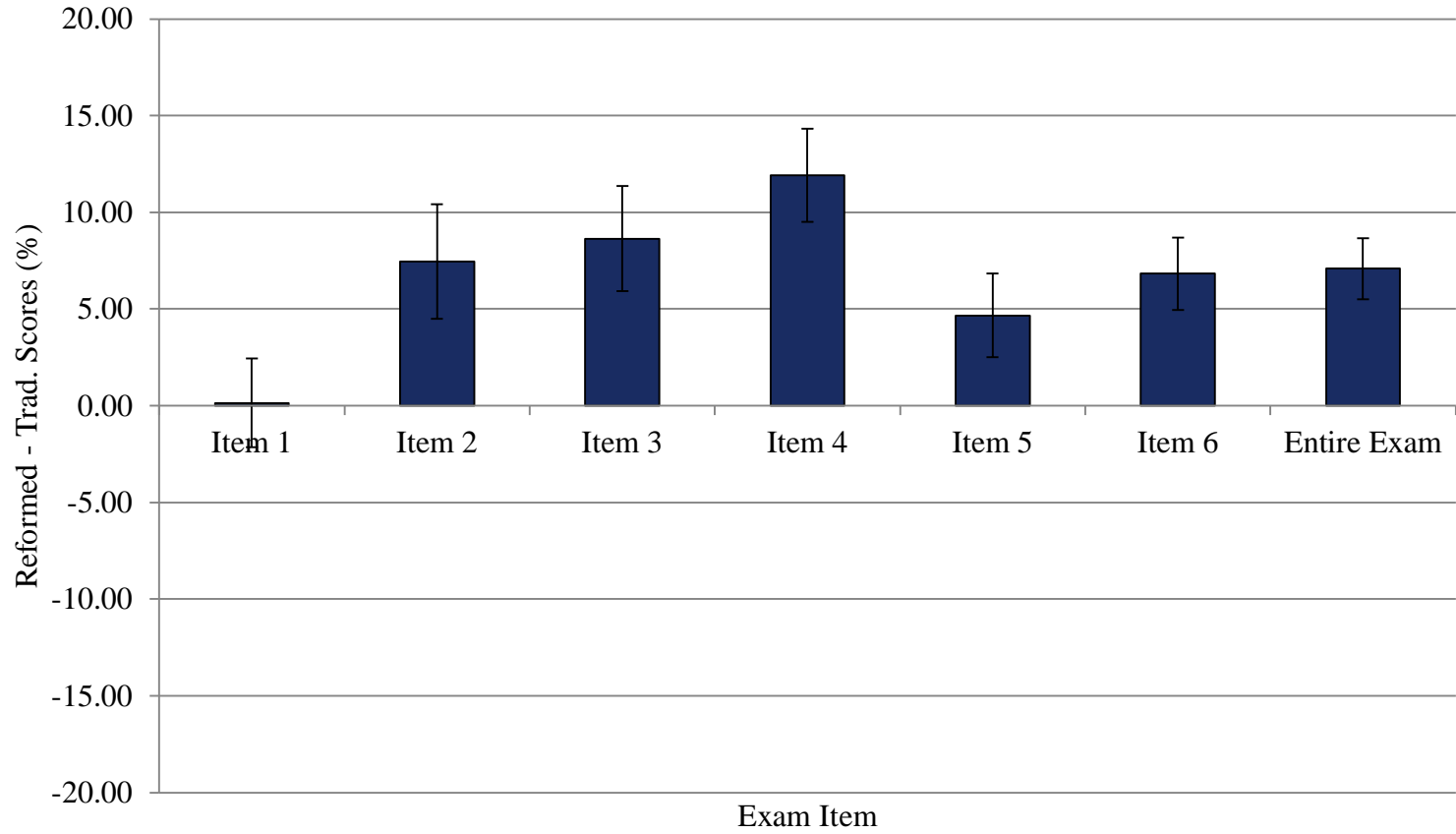




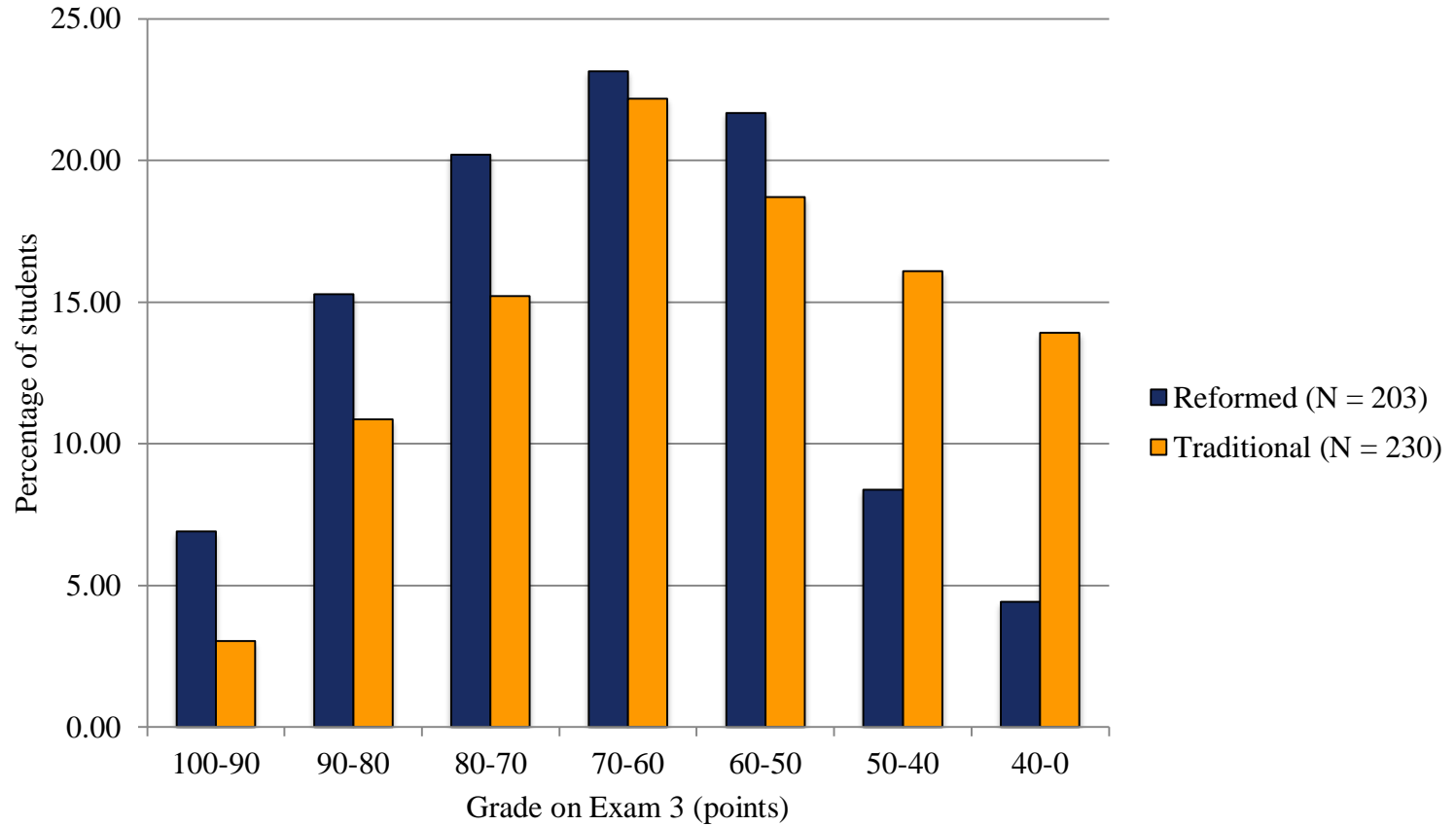
### Exam 3



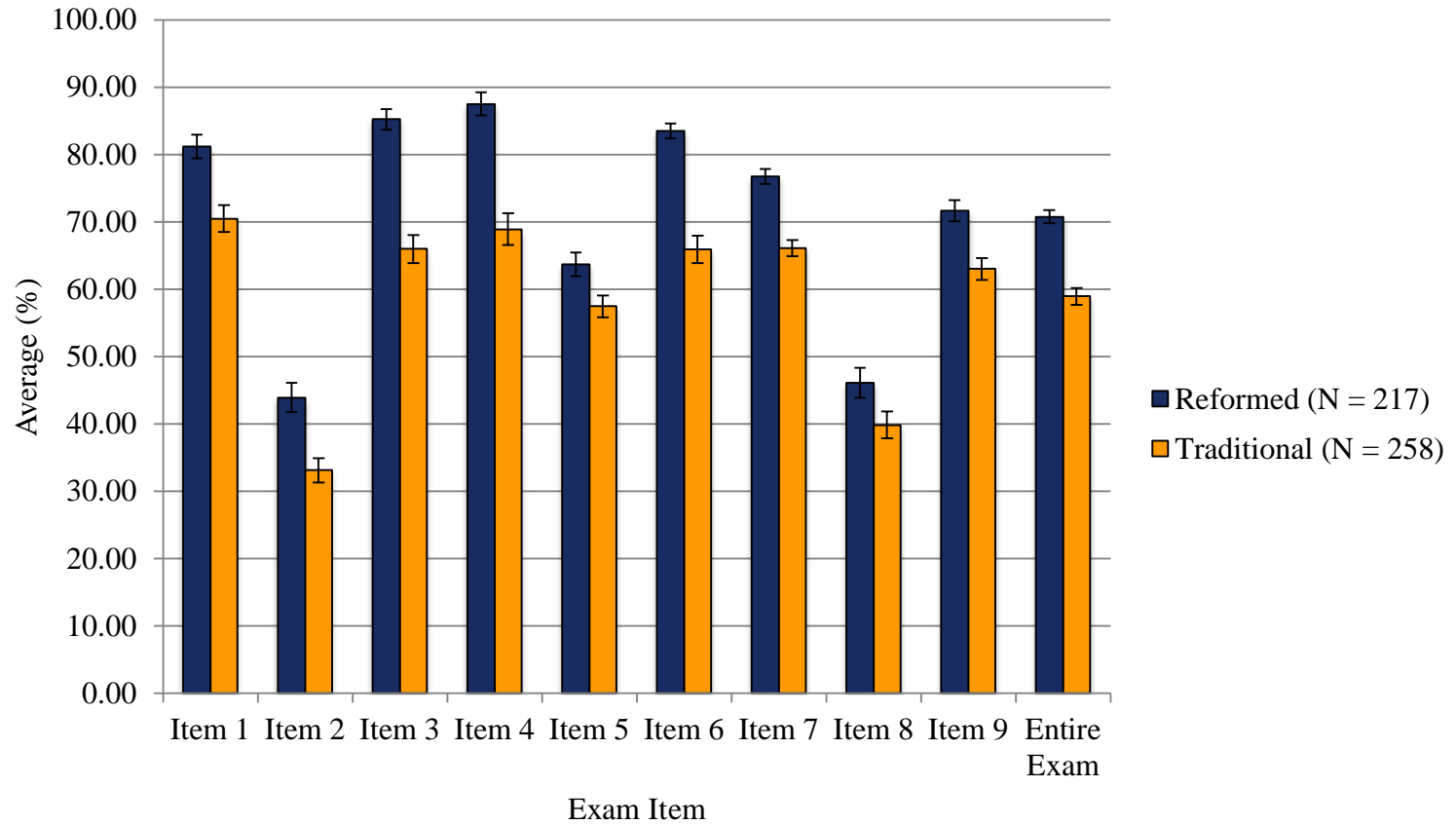
### Exam 3



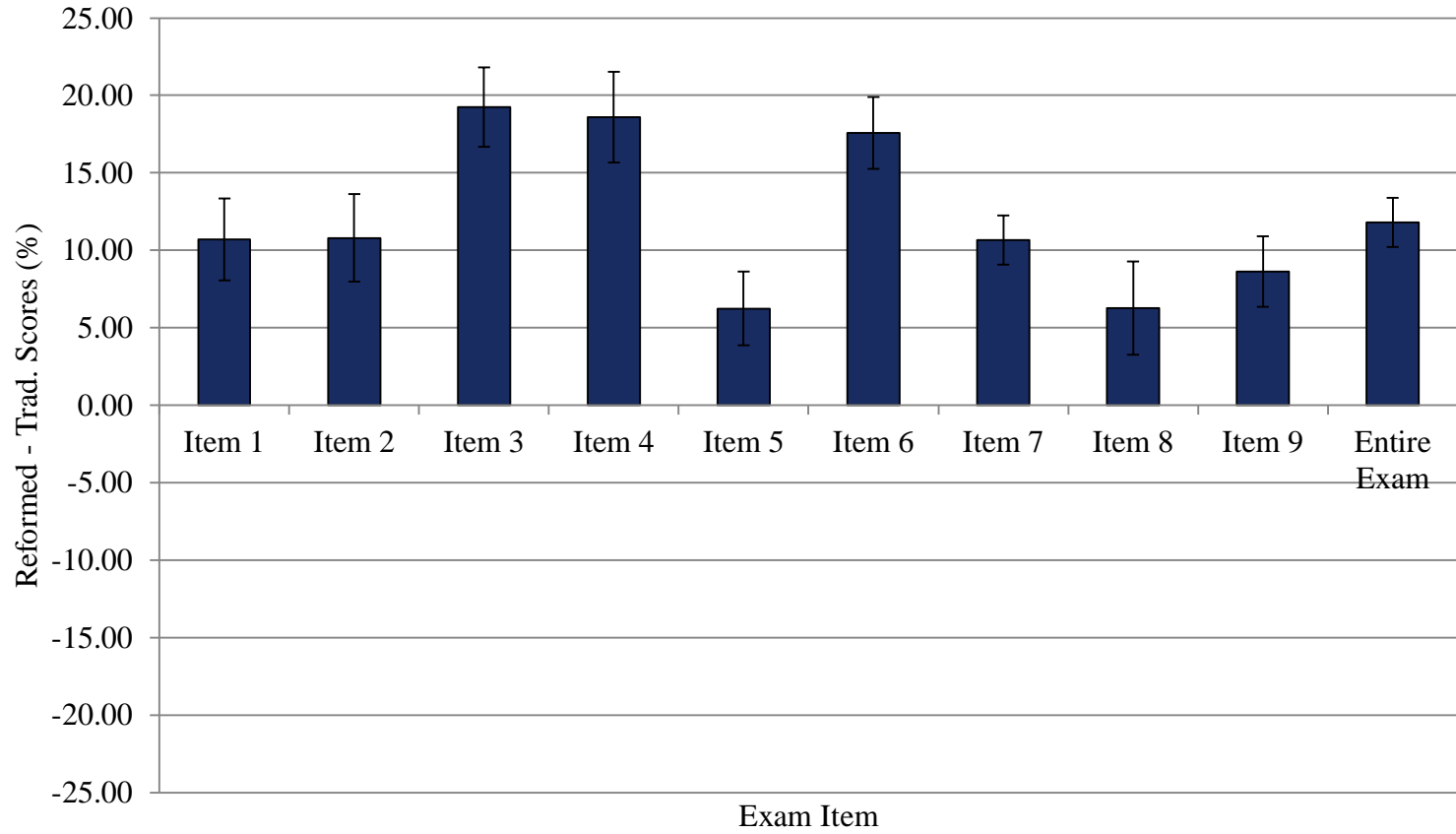
### Exam 3



## Final Exam



## Final Exam



## Final Exam

